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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/686,784	10/10/2000	Miguel Philipe Paul Peeters	1875.5450000	4881
26111	7590	07/14/2006	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX PLLC 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			WANG, TED M	
			ART UNIT	PAPER NUMBER
			2611	

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/686,784

Applicant(s)

PEETERS, MIGUEL PHILIP
PAUL

Examiner

Ted M. Wang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed on 04/28/2006, with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1-3, 5, 10-12, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) in view of Smith (US 5,365,470).

- In regard claim 1, Barton et al. discloses a multimode digital modem for demodulating a multi-tone, multi-band signal using an inverse discrete Fourier transform or inverse fast Fourier transform (Fig.3 element 340) to generate a signal having plurality of tones spaced in frequency in a plurality of frequency bands (Fig.3), comprising
 - a plurality of demodulators (Fig.10 elements 410/411 (filter), 420/421 (converter), 430/431 (DFT), 440/441 (equalizer), where the disclosure of the instant application, as recited in page 2 lines 2-21 and Fig.3 and 4, discloses a demodulator comprising filter 302/310, DFT 244, and equalizer 248a) is configured

to demodulate a different one of the plurality of frequency bands of the multi-tone, multi-band signal (column 14 lines 1-14. Since receiver 400 is configured for the general case of detecting the over-the-air transmission from transmitter 300 via plurality of processing paths for "diversity reception", that is, each receiver 400 may be arranged with a plurality of receiving paths 401, . . . , 402 (e.g., receiving antennas) to detect the propagating RF signal from transmitter 300, it is inherent that Barton's receiver is capable of demodulating a different one of the plurality of frequency bands of the multi-tone, multi-band signal.), and

wherein each demodulator includes a discrete Fourier transform module (Fig.10 element 430) that performs a discrete Fourier transform; and

wherein the plurality of demodulators are configured to perform demodulation in parallel (Fig.10 element 400 and column 14 lines 1-14).

Barton et al. discloses all of subject matter as described in the above paragraph except for specifically teaching each of the plurality of demodulators is configured to utilize a different sampling rate, and at least two of the plurality of demodulator have different discrete Fourier transform sizes.

However, Smith teaches a receiver comprises a plurality of demodulators (Fig.6 and column 6 lines 58-68), each of the plurality of demodulators is configured to utilize a different sampling rate (Fig.1 elements 10, Fig.6 element 178 outputs, column 6 lines 46-50 and column 6 line 61 – column 7 line 3), and at least two of

the plurality of demodulator have different discrete Fourier transform sizes (Fig. 1 elements 10, Fig. 6 element 178 outputs, and column 6 line 20 – column 7 line 3). Smith teaches a receiver 150 connected to the antenna 148 processes the received signal and transmits it to an Analog to Digital converter 160 which transmits a digitized signal to a window presum 162. The window presum 162 reduces the frequency range to specific bands for sampling. In Fig. 6, there are different DFT sizes or points (N , $N/8$, $N/2$, $N/16$, ... etc.) generated at window presum output. It is inherent that each of the plurality of demodulators is configured to utilize a different sampling rate.

It is desirable to have a receiver comprising a plurality of demodulators, wherein each of the plurality of demodulators is configured to utilize a different sampling rate, and at least two of the plurality of demodulator have different discrete Fourier transform sizes in order to simultaneously process different size FFTs to allow efficient sharing of processing elements and reduce overall hardware requirements (abstract lines 13-16). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the N-point DFT 430/431 of Barton's demodulation circuit to include the window presume and FFTMP circuit as taught by Smith so as to simultaneously process different size FFTs to allow efficient sharing of processing elements and reduce overall hardware requirements so that the system cost is reduced.

- In regard claim 2, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.

- In regard claim 3, Barton et al. further discloses that each demodulator further includes an equalizer connected to the output of the discrete Fourier transform in Fig.10 elements 440 and 441 and column 14 lines 42-58.
 - In regard claim 5, Barton et al. further discloses that a transceiver including a receiver (Fig. 3 and Fig.10, and column 6 lines 57-58).
 - In regard claim 10, Barton et al. further discloses that the multi-band signal is generated by filtering the output of the modulator (Fig.3 element 380).
 - In regard claim 11, which is a method claim related to claim 1. All limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.
 - In regard claim 12, which is a method claim related to claim 3. All limitation is contained in claims 3. The explanation of all the limitation is already addressed in the above paragraph.
 - In regard claim 14, which is a method claim related to claim 5. All limitation is contained in claims 5. The explanation of all the limitation is already addressed in the above paragraph.
 - In regard claim 17, which is a method claim related to claim 10. All limitation is contained in claims 10. The explanation of all the limitation is already addressed in the above paragraph.
4. Claims 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Smith (US 5,365,470) as applied above to claim 1, and further in view of Allpress et al. (US 6,496,546).

- In regard claim 4, Barton et al. and Smith disclose all subject matter as described in the above paragraph except for specifically teaching that wherein each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform.

However, Allpress et al. teaches wherein each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform (Fig.6A element FIR filter and FILTER 1– FILTER N).

It is desirable that wherein each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform in order to improve the noise and design complexity so that the communication quality is improved and system cost is reduced. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Allpress et al. in which, wherein each demodulator further includes a filter for filtering the received signal prior to the discrete Fourier transform, into Barton et al. and Smiths' receiver so as to improve the noise and design complexity so that the communication quality is improved and system cost is reduced.

- In regard claim 13, which is a method claim related to claim 4. All limitation is contained in claims 4. The explanation of all the limitation is already addressed in the above paragraph.

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5. Claim 6-8, and 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Smith (US 5,365,470) as applied above to claim 5, and further in view of Ho et al. (US 5,317,596).

- In regard claim 6, Barton et al. and Smith disclose all subject matter as described in the above paragraph except for specifically teaching that each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal.

However, Ho et al. teaches that each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal (Fig.3 element 100 and column 5 line 26 – column 6 line 25).

It is desirable that each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal in order to cancel the interference (column 5 line 26 – column 6 line 25) so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Ho et al. in which, each demodulator includes an echo canceller for removing an echo associated with a signal in a transmitter of the transceiver from the received signal, into Barton et al. and Smiths' receiver so as to cancel the interference so that the communication quality is improved.

- In regard claim 7, Barton et al. and Smith disclose all subject matter as described in the above paragraph except for specifically teaching that echo canceller is connected to remove the echo at the input to the discrete Fourier transform.

However, Ho et al. teaches that the echo canceller is connected to remove the echo at the input to the discrete Fourier transform (Fig.3 elements 100 and 56 and column 5 line 26 – column 6 line 25).

It is desirable that echo canceller is connected to remove the echo at the input to the discrete Fourier transform in order to provide an improved echo canceller that accurately estimates and eliminates unwanted echo present in full-duplex data communication channels (column 4 lines 3-6) so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Ho et al. in which, echo canceller is connected to remove the echo at the input to the discrete Fourier transform, into Barton et al. and Smiths' demodulation circuit so as to eliminates unwanted echo present in full-duplex data communication channels so that the communication quality is improved.

- In regard claim 8, Barton et al. and Smith disclose all subject matter as described in the above paragraph except for specifically teaching that each echo canceller comprises an adaptive filter.

However, Ho et al. teaches that each echo canceller comprises an adaptive filter (column 6 line 50 – column 7 line 4).

It is desirable that each echo canceller comprises an adaptive filter in order to improve the echo cancellation performance (column 7 lines 1-4) so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Ho et al. in which, each echo canceller comprises an adaptive filter, into Barton et al. and Smiths' demodulation circuit so as to improve the echo cancellation performance so that the communication quality is improved.

- In regard claim 15, which is a method claim related to claim 6. All limitation is contained in claims 6. The explanation of all the limitation is already addressed in the above paragraph.

6. Claims 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Smith (US 5,365,470) as applied above to claims 1 and further in view of Agee (US 6,128,276).

- In regard claims 9 and 16, Barton et al. and Smith disclose all subject matter as described in the above paragraph except for specifically teaching that the signal is generated by nulling selected tones in the modulator.

However, Agee teaches that the signal is generated by nulling selected tones in the modulator (column 6 line 5-17 and column 9 lines 49-59).

It is desirable that that the signal is generated by nulling selected tones in the modulator to eliminate out-of-cell interference (column 5 lines 1-14). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Agee in which, the signal

is generated by nulling selected tones in the modulator, into Barton et al. and Smiths' modulator circuit so as to eliminate out-of-cell interference.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Smith (US 5,365,470) as applied above to claims 1, and further in view of Liu et al. (US 6,442,195).

- In regard claim 18, Barton et al. and Smith disclose all subject matter as described in the above paragraph except for specifically teaching that the receiver comprises a splitter wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators.

However, Liu et al. teaches the receiver comprises a splitter (Fig.2 element 210 and column 6 lines 32-50), wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators (Fig.2 element 295, column 6 line 51 – column 7 line 5, and Fig.3 and column 7 line 55 – column 8 line 4).

It is desirable that the receiver comprises a splitter wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators in order to improve the frequency band selecting ability so that the communication quality is improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Liu et al. in which, that the receiver comprises a splitter wherein the splitter communicates each of the plurality of data signals to one of the plurality of demodulators, into Bartons et al. and Smiths' demodulation circuit so as

to improve the frequency band selecting ability so that the communication quality is improved.

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al. (US 6,654,431) and Smith (US 5,365,470) as applied above to claims 1, and further in view of Kahre (US 5,680,388).

- In regard claims 19 and 20, Barton et al. and Smith disclose all subject matter as described in the above paragraph except for specifically teaching that the discrete Fourier transform module performs a discrete Fourier transform at sampling frequency (F_s , k) wherein the sampling frequency (F_s , k) is associated with the frequency band of the demodulator, and wherein the sampling frequency is at least double the maximum frequency of the frequency band of the demodulator.

However, Kahre teaches that the discrete Fourier transform module performs a discrete Fourier transform (Fig.2 element S) at sampling frequency (F_s , k) wherein the sampling frequency (F_s , k) is associated with the frequency band of the demodulator (Fig.2 element U, and column 4 lines 23-40); and wherein the sampling frequency is at least double the maximum frequency of the frequency band of the demodulator (column 4 lines 22-40).

It is desirable that the discrete Fourier transform module performs a discrete Fourier transform at sampling frequency (F_s , k) wherein the sampling frequency (F_s , k) is associated with the frequency band of the demodulator and wherein the sampling frequency is at least double the maximum frequency of the frequency band of the demodulator in order to improve the synchronization (column 4 lines 23-

40) and data recovery so that the communication performance can be improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Kahre in which the discrete Fourier transform module performs a discrete Fourier transform at sampling frequency (F_s , k) wherein the sampling frequency (F_s , k) is associated with the frequency band of the demodulator and wherein the sampling frequency is at least double the maximum frequency of the frequency band of the demodulator, into Barton et al. and Smiths' receiver so as to improve the synchronization.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

10. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053.

The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M Wang
Examiner
Art Unit 2611

Ted M. Wang


CHIEH M. FAN
SUPERVISORY PATENT EXAMINER